REMARKS

I. Background

The present remarks are in response to the Final Office Action mailed July 26, 2007. Claims 1-15 were pending in the application for consideration at the time of the mailing of the Final Office Action. New claims 40-43 have been added, which are fully supported by the specification, examples, and claims as originally filed.[1] Thus, claims 1-15 and 40-43 are currently pending for consideration on the merits.[2]

II. Rejection on the Merits

A. Rejections Under 35 U.S.C. § 102(b)

The Office Action rejects claims 1, 6-10, and 14-15 under 35 U.S.C. § 102(b) as being anticipated by *Masanori et al.* (JP-1185301 Abstract). Applicant respectfully traverses the rejection because *Masanori* does not teach or suggest each and every element of the presently pending claims.

According to Applicant's understanding, *Masanori* teaches dissolving chitosan in an acid, adding an alkali to the chitosan solution to suspend the chitosan, and then adding H_2O_2 to the resulting chitosan suspension to reduce the molecular weight of the chitosan (Abstract). That is, the chitosan solution is alkalized and then H_2O_2 is added to degrade the chitosan to obtain the low-molecular weight. *Masanori* then teaches that the low-molecular weight chitosan is obtained when the pH is in the range of 7-12 (alkaline) and a temperature of 40-90 degrees C. The low-molecular weight chitosan is obtained as a white powder (Abstract). However, *Masanori* is completely devoid of teaching or suggesting that chitosan can be degraded in an aqueous acidic solution, and only teaches or suggests that chitosan can be degraded in an alkaline solution with H_2O_2. Additionally, *Masanori* is completely devoid of teaching or suggesting that

1 Applicant respectfully requests entry of the new claims because they do not include new matter and include the limitations of independent claim 1, and thereby are not patentably distinct.

2 For the Examiner's convenience and reference, Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action. Please note that the following remarks are not intended to be an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Rather, the distinctions identified and discussed below are presented solely by way of example to illustrate some of the differences between the claimed invention and the cited references. In addition, Applicant requests that the Examiner carefully review any references discussed below to ensure that Applicant's understanding and discussion of the references, if any, is consistent with the Examiner's understanding.

a microcrystalline chitosan can be precipitated. Since the product of *Masanori* is a chitosan powder, *Masanori* is completely devoid of teaching or suggesting that a microcrystalline chitosan can be obtained by the process described therein. Moreover, *Masanori* is completely devoid of teaching or suggesting that dissolving chitosan in an aqueous acidic solution is equivalent to or results in degrading chitosan. Thus, *Masanori* does not teach or suggest each and every element of the presently claimed invention.

Applicant objects to the characterization of *Masanori* recited in the Office Action because it does not teach that which is alleged. The Office Action asserts that *Masanori* teaches the following:

> a method for modifying chitosan, the method comprising **dissolving (degrading) chitosan in an acidic solution**; then adding an alkali, specifically sodium hydroxide, to obtain a 0.5%-10% chitosan solution with a pH of 7-12 (abstract). The **chitosan is precipitated out with H_2O_2** (abstract). (emphasis added)[3]

However, after a thorough review of *Masanori*, Applicant does not agree with the characterization of *Masanori* provided in the Office Action. This is because of the following: (1) *Masanori* does not teach or suggest that dissolving chitosan in an aqueous acid solution degrades the chitosan; and (2) *Masanori* does not teach or suggest precipitating a microcrystalline chitosan. Contrary to the assertions provided in the Office Action, *Masanori* actually teaches that an alkali (e.g., NaOH) is added to the solution to suspend the chitosan, and then H_2O_2 is added to the resulting chitosan suspension to degrade the chitosan. Thus, *Masanori* does not teach that H_2O_2 or any other process or substance precipitates the powdered chitosan.

Since *Masanori* is completely devoid of any teaching or suggestion regarding a "method for preparing modified microcrystalline chitosan," "degrading chitosan in an aqueous acidic solution" and/or "precipitating said microcrystalline chitosan from said solution," as recited in claim 1, *Masanori* does not teach or suggest each and every limitation of independent claim 1. Therefore, the presently claimed invention as recited in claim 1 is not anticipated by *Masanori*. Claims 2-15 depend from independent claim 1, and thereby incorporate the limitations thereof. As such, Applicant submits that claims 2-15 are allowable over *Masanori* for at least the same reasons as discussed above with regard to claim 1. Thus, the Applicant respectfully requests reconsideration and withdrawal of the rejections to claims 1-15 under 35 U.S.C. § 102(b) relative to *Masanori*.

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3 Final Office Action mailed July 26, 2007, page 3.

B. Rejections Under 35 U.S.C. § 103(a)

The Office Action rejects claims 1-3 and 12-13 under 35 U.S.C. § 103(a) as being unpatentable over *Kazutsune et al.* (JP-2069502 Abstract) in view of *Masanori*. Applicant respectfully traverses the rejection because the combination of *Kazutsune* and *Masanori* does not teach or suggest each and every element of the presently pending claims, and thereby a *prima facie* case of obviousness has not been established.

The foregoing discussion of *Masanori* is relevant to the instant rejection and is incorporated into this remark by specific reference. Additionally, Applicant respectfully asserts that *Kazutsune* does not cure all of the deficiencies of *Masanori* recited above.

According to Applicant's understanding, *Kazutsune* teaches that chitosan is degraded with chitosanase, and simultaneously or after the reaction, an alkali (e.g., NaOH) is added thereto to raise the pH to 7-10, and as necessary, filtration or membrane treatment is carried out using a precise filtration membrane to separate enzymatic reaction product from chitosan (Abstract). However, *Kazutsune* is completely devoid of teaching or suggesting that a microcrystalline chitosan can be precipitated. Moreover, *Kazutsune* is completely devoid of teaching or suggesting that a microcrystalline chitosan can be obtained by the process described therein. Furthermore, *Kazutsune* is completely devoid of teaching or suggesting that dissolving chitosan in an aqueous acidic solution is equivalent to or results in degrading chitosan. Thus, *Kazutsune* does not teach or suggest each and every element of the presently claimed invention and does not cure the deficiencies of *Masanori*.

Applicant objects to the characterization of *Kazutsune* recited in the Office Action because it does not teach that which is alleged. The Office Action asserts that *Kazutsune* teaches that the chitosan is precipitated from the solution. This is not the case. Nothing in *Kazutsune* references precipitation and/or a microcrystalline chitosan. In fact, *Kazutsune* separates the chitosan by filtration not by precipitation. Therefore, *Kazutsune* does not teach or suggest precipitating a microcrystalline chitosan as alleged in the Office Action.

Applicant respectfully asserts that the combination of *Kazutsune* and *Masanori* does not teach or suggest each and every element of the presently pending claims. More particularly, the combination of references is completely devoid of teaching or suggesting that a microcrystalline chitosan can be precipitated. Additionally, the combination of references is completely devoid of teaching or suggesting that a microcrystalline chitosan can be obtained by the process described therein. Thus, the combination of references does not teach precipitation or formation

of a microcrystalline chitosan, and thereby does not teach or suggest each and every element of the presently claimed invention as recited in claim 1.

Additionally, Applicant respectfully asserts there is no motivation, suggestion, or reason to modify the teachings of the combination of *Kazutsune* and *Masanori* in order to arrive at the present invention. For example, nothing in *Kazutsune* and/or *Masanori* provides any motivation, suggestion, or reason that the a microcrystalline chitosan composition can be prepared. Additionally, nothing in *Kazutsune* and *Masanori* provides any motivation, suggestion, or reason that chitosan or a microcrystalline chitosan can be precipitated. Thus, there is no motivation, suggestion, or reason to modify any of the references, alone or in combination, in order to arrive at the present invention recited in claim 1.

Since the combination of *Kazutsune* and *Masanori* does not teach or suggest each and every limitation of independent claim 1, and does not provide any motivation, suggestion, or reason to modify the teachings thereof in order to obtain the claimed invention, a *prima facie* case of obviousness has not been established with respect to claim 1. Claims 2-3 and 12-13 depend from independent claim 1, and thereby incorporate the limitations thereof. As such, Applicant submits that claims 2-3 and 10 are allowable over the combination of *Kazutsune* and *Masanori* for at least the same reasons as discussed above with regard to claim 1. Thus, the Applicant respectfully requests reconsideration and withdrawal of the rejections to claims 1-3 and 12-13 under 35 U.S.C. § 103(a) relative to *Kazutsune*.

The Office Action rejects claims 1 and 4-11 under 35 U.S.C. § 103(a) as being unpatentable over *Kawamura et al.* (U.S. 4,833,323). Applicant respectfully traverses the rejection because *Kawamura* does not teach or suggest each and every element of the presently pending claims, and thereby a *prima facie* case of obviousness has not been established.

According to Applicant's understanding, *Kawamura* teaches a "process for producing granular porous chitosan of extremely uniform particle size and having uniform fine pores on the spherical surface and cut cross sectional face" (Abstract). According to *Kawamura*, the "process comprises dissolving a low molecular weight chitosan into an aqueous acidic solution, pouring the solution into a basic solution and thereby coagulating the product to precipitate porous chitosan" (Abstract). Additionally, *Kawamura* teaches that the granular porous chitosan can be crosslinked using an organic diisocyanate compound (col. 2, lines 32-42). More particularly, *Kawamura* teaches that an aqueous acid solution of chitosan coagulates when introduced into a coagulating bath, which is exemplified by a "basic solution" (col. 3, lines 5-54). Also,

Kawamura teaches that the chitosan forms a finely porous structure while settling in the coagulating bath in the form of granules (col. 3, lines 37-42). While *Kawamura* teaches the use of low molecular weight chitosan, the reference also teaches that low molecular weight chitosan can be produced by "applying heating treatment to chitosan in an aqueous solution of sodium perborate" (col. 2, lines 60-68). However, *Kawamura* is completely devoid of teaching or suggesting that chitosan can be degraded in an aqueous acidic solution. Additionally, *Masanori* is completely devoid of teaching or suggesting that a microcrystalline chitosan can be precipitated. Since the product is a granular porous chitosan and is a coagulated chitosan, *Kawamura* is completely devoid of teaching or suggesting that a microcrystalline chitosan can be obtained by the process described therein. Moreover, *Kawamura* is completely devoid of teaching or suggesting that dissolving chitosan in an aqueous acidic solution is equivalent to or results in degrading chitosan. Thus, *Kawamura* does not teach or suggest each and every element of the presently claimed invention.

Applicant objects to the characterization of *Kawamura* recited in the Office Action because it does not teach that which is alleged. The Office Action asserts that "*Kawamura* teaches a method for modifying chitosan, the method comprising dissolving (degrading) chitosan in an aqueous acid solution, followed by adding an alkali (abstract) and precipitating the chitosan." However, after a thorough review of *Kawamura*, Applicant does not agree with the characterization of *Kawamura* provided in the Office Action. This is because of the following: (1) *Kawamura* does not teach or suggest that dissolving chitosan in an aqueous acid solution degrades the chitosan; and (2) *Kawamura* does not teach or suggest precipitating a microcrystalline chitosan. Contrary to the assertions provided in the Office Action, *Kawamura* actually teaches that an aqueous acidic solution of chitosan "is poured in a predetermined amount into a coagulating bath through a discharge hole" such that the chitosan "forms finely porous structure while settling in the coagulating bath in the form of granules" (col. 3 lines 16-42). As such, *Kawamura* does not teach or suggest precipitating a microcrystalline chitosan.

Additionally, Applicant respectfully asserts there is no motivation, suggestion, or reason to modify the teachings of *Kawamura* in order to arrive at the present invention. For example, nothing in *Kawamura* provides any motivation, suggestion, or reason that a microcrystalline chitosan composition can be prepared. Additionally, nothing in *Kawamura* provides any motivation, suggestion, or reason that chitosan can be degraded in an aqueous acidic solution, and in fact, only teaches dissolving chitosan in such an aqueous acidic solution. Furthermore,

nothing in *Kawamura* provides any motivation, suggestion, or reason that a microcrystalline chitosan can be precipitated, and in fact, only teaches precipitation of a granular porous chitosan as the chitosan coagulates in a coagulating solution. Thus, there is no motivation, suggestion, or reason to modify *Kawamura* in order to arrive at the present invention recited in claim 1.

Since *Kawamura* does not teach or suggest each and every limitation of independent claim 1, and there is no motivation, suggestion, or reason to modify *Kawamura* in order to arrive at the present invention, a *prima facie* case of obviousness has not been established with respect to claim 1. Claims 4-11 depend from independent claim 1, and thereby incorporate the limitations thereof. As such, Applicant submits that claims 4-11 are allowable over *Kawamura* for at least the same reasons as discussed above with regard to claim 1. Thus, the Applicant respectfully requests reconsideration and withdrawal of the rejections to claims 1 and 4-11 under 35 U.S.C. § 103(a) relative to *Kawamura*.

III. New Claims

Applicant respectfully requests entry and consideration of new claims 40-43. Claims 40-43 include the limitations of independent claim 1, and thereby are allowable for the same reasons claim 1 is allowable as recited above. Additionally, claims 40-43 are each independently allowable by having claim elements that are not taught or suggested by the cited references, alone or in combination.

SUMMARY

In view of the foregoing, Applicant respectfully submits that the other rejections to the claims are now moot and do not, therefore, need to be addressed individually at this time. It will be appreciated, however, that this should not be construed as Applicant acquiescing to any of the purported teachings or assertions made in any action regarding the cited art or the pending application, including any Official Notice. Instead, Applicant reserves the right to challenge any of the purported teachings or assertions made in any action at any appropriate time in the future, should the need arise. Furthermore, to the extent that the Examiner has relied on any Official Notice, explicitly or implicitly, Applicant specifically requests that the Examiner provide references supporting the teachings officially noticed, as well as the required motivation, suggestion, or reason to combine the relied upon Notice with the other art of record.

Applicant believes claims 1-15 and 40-43 are in allowable form as discussed above. Thus, Applicant respectfully requests reconsideration of the application and allowance of presently pending claims. In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney by telephone at (801) 533-9800.

Dated this 31st day of October, 2007.

Respectfully submitted,

/Fraser D. Roy, Reg.# 45666/
FRASER D. ROY
Attorney for Applicant
Registration No. 45,666
Customer No. 057360
Telephone (801) 533-9800

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